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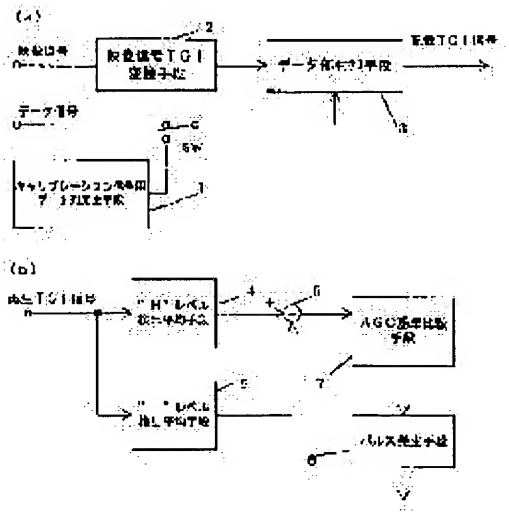
(54) AUTOMATIC GAIN ADJUSTMENT DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To prevent malfunction of automatic gain control(AGC) when vertical synchronization is disturbed without addition of an undesired circuit used for a magnetic recording and reproducing device.

SOLUTION: A calibration signal data string generating means 1 provides consecutive 0s for a prescribed period and then outputs consecutive 1s for a prescribed period and a data addition means 3 adds a data signal and the AGC calibration signal to a video signal subject to time base compression multiplex (TCI) conversion. The data signal and the AGC calibration signal are added for a horizontal blanking period, and in the case of reproduction, a level difference of the AGC calibration signal added to the reproduced TCI signal and a level difference of the AGC calibration signal at recording are compared to adjust the gain.



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CLAIMS

[Claim(s)]
[Claim 1] A data stream generating means for predetermined to carry out period continuation and to output the video-signal Time-Division-Multiplexing conversion means which carries out Time-Division-Multiplexing conversion of the video signal, and level which outputted [predetermined carried out period continuation of the predetermined level, and] and is continuously different from said predetermined level, A data-division addition means to add the data signal which is an additional information signal, and the calibration signal outputted from said data stream generating means to the level blanking period of said video signal which carried out Time-Division-Multiplexing conversion, The 1st detection average means which detects the thing more than specific level among the calibration signals acquired when the record medium with which said video signal which carried out Time-Division-Multiplexing conversion was recorded is reproduced, and calculates the average, The 2nd detection average means which detects the following [said specific level] and calculates the average, A subtraction means to subtract the output of said 2nd detection average means from the output of said 1st detection average means, A comparison means to compare the output of said subtraction means with the calibration signal at the time of said record, The pulse which enlarges gain when the output of said subtraction means is small is generated as a result of the comparison by said comparison means. Automatic-gain-control equipment characterized by having a pulse generating means to generate the pulse which makes gain small when the output of said subtraction means is large, and continuing and adding the calibration signal at the time of said record to two or more Rhine of the level blanking period of said video signal which carried out Time Division Multiplexing.
[Claim 2] Automatic-gain-control equipment according to claim 1 characterized by detecting except for up-and-down Rhine among two or more Rhine which doubled the level of the calibration signal at the time of record with the level of a data signal, and recorded the calibration signal with the 1st detection average means and the 2nd detection average means, removing the standup and falling part of a signal.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the automatic-gain-control (Following AGC is called) equipment used for magnetic recorder and reproducing devices, such as a video tape recorder (Following VTR is called).
[0002]
[Description of the Prior Art] Conventionally, in order to make level of the regenerative signal of VTR into the same proper value as the time of record in VTR, there is keyed AGC which detects the electrical potential difference of the peak AGC which detects the peak value of a video signal and controls gain, and a synchronizing signal, and controls gain.
[0003] Moreover, VTR of the W-VHS (trademark) method in which an account rec/play student is possible shares a transit system for high definition video signals, such as a Hi-Vision broadcasting format, and the video signal of usual broadcasting formats, such as an NTSC broadcasting format, alternatively, and the format of a drum, a drum rotational frequency, a tape speed, etc. is carried out in common. When recording a Hi-Vision signal with this VTR, all the effective scanning lines in the scanning line of 1125 lines of 1032 lines of a Hi-Vision signal are extracted and divided into two, the perpendicular blanking scanning line is added, it considers as two NTSC similar signals of scanning-line 1050 (525x2) Rhine, and coincidence record of the signal of the 1 field is carried out on two tracks. As for a record signal-processing method, a TCI (Time Compress Integration : time-base-compaction multiplex) method is used. This carries out compression multiplex [of the luminance signal and color-difference signal in effective Rhine] on a time-axis, it is the signal which added the horizontal synchronization and the clamp reference signal, and FM record is carried out on a tape. In order to secure transposition with VTR of the present VHS method at this time, by dividing into three, two are used for video signals and one is used for the width of recording track for sound signals, respectively.
[0004] the case where AGC processing is performed since temporal emphasis of time amount shaft orientations and vertical vertical emphasis are performed with VTR of the W-VHS method mentioned above, using a digital digital disposal circuit as emphasis processing -- the gain precision at the time of A/D conversion -- the minimum resolution of a digital signal -- it must raise to below. For this reason, with VTR of a W-VHS method, when recording on a tape, as shown in drawing 4 , Rhine containing the level (CAL) used as the criteria of AGC was added to the perpendicular blanking period of an image, the level of this Rhine was detected at the time of playback, and the gain of AGC was adjusted so that it might be set to the same level as the time of record.
[0005] In addition, in the number of Rhine, and R, a Y+PR signal and B show Y+ PB signal, the Vertical Synchronizing signal which VS can identify [of the field], and the blank signal for switching points in BL, and DATA shows [the figure] the data signal here, respectively. Moreover, CAL is a calibration signal for AGC as shown in drawing 5 , for example, the gain of AGC is adjusted by detecting the difference of 100IRE and 50IRE(s). Moreover, the time code etc. is mainly contained in the data signal (DATA).
[0006] Drawing 6 (a) is the block diagram showing the configuration of the automatic-gain-control equipment at the time of recording the conventional calibration signal for AGC mentioned above. The calibration wave generation means for AGC for 11 to output the wave of the calibration signal for AGC, A calibration line addition means for 12 to add the wave of the calibration signal for AGC to a perpendicular blanking period, The wave of the calibration signal for AGC which 13 is a TCI conversion means and was generated by one line of the perpendicular blanking period of a video signal with the calibration wave generation means 11 for AGC is added with the calibration line addition means 12. It has the composition that the signal is changed by the record TCI signal with the TCI conversion means 13.
[0007] Moreover, drawing 6 (b) is the block diagram showing the configuration at the time of playback of conventional automatic-gain-control equipment, and, as for a calibration level detection means and

15, 14 is [an AGC criteria comparison means and 16] pulse generating means. Point to point level is detected by the calibration level detection means 14 from the reproduced TCI signal. It is compared with the level difference (for example, difference of 100IRE(s) shown in drawing 5 , and 50IRE(s)) of the calibration signal which the level difference recorded with the AGC criteria comparison means 15 at the time of record. A pulse which will make gain of AGC equipment small if the level of the calibration signal at the time of playback is larger than the time of record is outputted from the pulse generating means 16. If small, a pulse which enlarges gain of AGC equipment will be outputted from the pulse generating means 16.

[0008]

[Problem(s) to be Solved by the Invention] As mentioned above, the circuit for newly adding Rhine of the calibration signal for AGC to a perpendicular blanking period with VTRs, such as the conventional W-VHS method, and outputting the wave for calibrations was needed, and there was a trouble that the circuit scale also became large. Moreover, since Rhine of the calibration signal for AGC was established only in 1H, when the vertical synchronization shifted, there was a trouble of causing malfunction of AGC. Then, this invention offers the automatic-gain-control equipment which solves the trouble mentioned above.

[0009]

[Means for Solving the Problem] In order to solve the technical problem mentioned above, the automatic-gain-control equipment by this invention A data stream generating means for predetermined to carry out period continuation and to output the video-signal Time-Division-Multiplexing conversion means which carries out Time-Division-Multiplexing conversion of the video signal, and level which outputs [predetermined carries out period continuation of the predetermined level, and] and is continuously different from said predetermined level, A data-division addition means to add the data signal which is an additional information signal, and the calibration signal outputted from said data stream generating means to the level blanking period of said video signal which carried out Time-Division-Multiplexing conversion, The 1st detection average means which detects the thing more than specific level among the calibration signals acquired when the record medium with which said video signal which carried out Time-Division-Multiplexing conversion was recorded is reproduced, and calculates the average, The 2nd detection average means which detects the following [said specific level] and calculates the average, A subtraction means to subtract the output of said 2nd detection average means from the output of said 1st detection average means, A comparison means to compare the output of said subtraction means with the calibration signal at the time of said record, The pulse which enlarges gain when the output of said subtraction means is small is generated as a result of the comparison by said comparison means. It has a pulse generating means to generate the pulse which makes gain small when the output of said subtraction means is large. It is what is characterized by continuing and adding the calibration signal at the time of said record to two or more Rhine of the level blanking period of said video signal which carried out Time Division Multiplexing. Moreover, the level of the calibration signal at the time of record is doubled with the level of a data signal. With the 1st detection average means and the 2nd detection average means, it is characterized by detecting except for up-and-down Rhine among two or more Rhine which recorded the calibration signal, removing the standup and falling part of a signal.

[0010]

[Embodiment of the Invention] Hereafter, with reference to a drawing, a desirable example is explained per gestalt of operation of this invention. Drawing 1 is the block diagram showing an example of the automatic-gain-control equipment concerning this invention, and especially drawing 1 (a) is the block diagram having shown the configuration when recording the calibration signal for AGC. A video-signal TCI conversion means for the data stream generating means for calibration signals for generating 0 and 1 which continued in order that 1 might generate the calibration wave for AGC, and 2 to carry out TCI conversion of the inputted video signal, and 3 are the data-division addition means for adding to the video signal which carried out TCI conversion of the output or data signal of the data stream generating means 1 for calibrations. Next, the actuation is explained. The 1-bit data of 1 or 0 are added to the video

signal by which TCI conversion was carried out with the video-signal TCI conversion means 2 with the data-division addition means 3 at the level blanking period of a video signal, level of the TCI signal which will be recorded if data are 1 is made high ("H" level), and level of the TCI signal which will be recorded if it becomes zero is made low ("L" level). Thus, except for a perpendicular blanking period, a data signal and a video signal are recorded for every Rhine. Drawing 2 is the wave form chart showing an example of a data signal, and on the basis of central TCI pedestal level, when higher [than it] and lower than "H" level and it, it is set to "L" level.

[0011] Although data, time codes, etc., such as an image format, are contained as a data signal, wave-like data with which 0 and 1 which are predetermined level follow a predetermined period as shown in drawing 3 are generated by switching a switch to the data stream generating means 1 side for calibrations. At this time, 0 and 1 of data are fixed level and it always does not change. Moreover, this data stream for calibrations serves as the same level as the data signal mentioned above, and when data are 1 and "H" level and data are 0, it serves as "L" level. It adds to the video signal which carried out TCI conversion with the data-division addition means 3 like the data signal which mentioned above this data stream for calibrations. A change-over with 0 and 1 of the data stream for calibration signals is performed by a switch, the counter, etc. In addition, record to the level blanking period of the calibration signal for AGC is performed by covering two or more Rhine at this time.

[0012] At the time of playback, the data signal added to the playback TCI signal is compared with TCI pedestal level, and 0 is detected, when high and 1 is low (at the time of "L" level) (when it is "H" level). Drawing 1 (b) is the block diagram showing the configuration at the time of playback of an automatic-gain-control circuit. For "H" level detection average means and 5, as for a subtractor and 7, "L" level detection average means and 6 are [4 / an AGC criteria comparison means and 8] pulse generating means. Next, the actuation is explained. "Although inputted into H" level detection average means 4 and "L" level detection average means 5, when higher than the TCI pedestal level (specific level) used as criteria (at the time of "H" level)", when low (at the time of "L" level), it inputs into H" level detection average means 4 to "L" level detection average means 5, respectively, and the calibration signal for AGC added to a playback TCI signal is **. The inputted calibration signal for AGC the level change section (from level "to H" level ["L" level, "L"]" it changes to TCI pedestal level from H" level starting from TCI pedestal level and falling part) which waveform distortion produces The center section except several lines of the upper and lower sides of two or more Rhine where the avoided part and the calibration signal were recorded The average of (for example, detecting four lines of the center except two lines of the upper and lower sides, when the calibration signal is recorded on eight lines for the time of record) It calculates, respectively with "H" level detection average means 4 and "L" level detection average means 5. The output of L level detection average means 5 "from the output of H" level detection average means 4" is subtracted with a subtractor 6, and the AGC criteria comparison means 7 compares the value with the difference of "H" level and "L" level at the time of record. Consequently, if the difference at the time of playback is larger than the difference at the time of record, a pulse which makes gain of AGC small will be outputted from a pulse generator 8, and if the difference at the time of playback is smaller than the difference at the time of record, a pulse which enlarges gain of AGC will be outputted from a pulse generator 8.

[0013] Since several lines are covered, the calibration signal for AGC is recorded also by turbulence of a vertical synchronization which takes place at the time of the mode change of a search, a still, playback, etc. and the average of the level change section of the calibration signal for AGC and the part except up-and-down Rhine is used for detection by the above configurations at the time of playback, malfunction of AGC is not caused. Moreover, since the circuit of simple configurations, such as a switch which continues and outputs 1 bit data of 0 and 1 although the wave of the calibration signal for AGC is generated, and a counter, is used and the level is made equal to a data signal, the scale of the circuit for generating the calibration signal for AGC is small, and ends, and a cost cut can be aimed at.

[0014] When the data other than a configuration of having mentioned above are 0 and "H" level and data are 1, it is good also as "L" level (negative logic). Moreover, although it can gather 2 bits not only of two, "H" level and "L" level, but digital data at a time and can also record as four level, 0, 1, 2, and 3, it

can consider as the calibration signal for AGC by putting this time predetermined level in order continuously.

[0015]

[Effect of the Invention] According to this invention, even if a vertical synchronization shifts, since the average of the part except several lines of the upper and lower sides of two or more Rhine where two or more Rhine was covered, the calibration signal for AGC was recorded, and the level change section of the calibration signal for AGC and a calibration signal were recorded at the time of playback is used for detection, malfunction of AGC is not caused. Moreover, since the circuit for generating the wave of the calibration signal for AGC can be managed with a simple configuration, a cost cut can be aimed at.

MEANS

[Means for Solving the Problem] In order to solve the technical problem mentioned above, the automatic-gain-control equipment by this invention A data stream generating means for predetermined to carry out period continuation and to output the video-signal Time-Division-Multiplexing conversion means which carries out Time-Division-Multiplexing conversion of the video signal, and level which outputs [predetermined carries out period continuation of the predetermined level, and] and is continuously different from said predetermined level, A data-division addition means to add the data signal which is an additional information signal, and the calibration signal outputted from said data stream generating means to the level blanking period of said video signal which carried out Time-Division-Multiplexing conversion, The 1st detection average means which detects the thing more than specific level among the calibration signals acquired when the record medium with which said video signal which carried out Time-Division-Multiplexing conversion was recorded is reproduced, and calculates the average, The 2nd detection average means which detects the following [said specific level] and calculates the average, A subtraction means to subtract the output of said 2nd detection average means from the output of said 1st detection average means, A comparison means to compare the output of said subtraction means with the calibration signal at the time of said record, The pulse which enlarges gain when the output of said subtraction means is small is generated as a result of the comparison by said comparison means. It has a pulse generating means to generate the pulse which makes gain small when the output of said subtraction means is large. It is what is characterized by continuing and adding the calibration signal at the time of said record to two or more Rhine of the level blanking period of said video signal which carried out Time Division Multiplexing. Moreover, the level of the calibration signal at the time of record is doubled with the level of a data signal. With the 1st detection average means and the 2nd detection average means, it is characterized by detecting except for up-and-down Rhine among two or more Rhine which recorded the calibration signal, removing the standup and falling part of a signal.

[0010]

[Embodiment of the Invention] Hereafter, with reference to a drawing, a desirable example is explained per gestalt of operation of this invention. Drawing 1 is the block diagram showing an example of the automatic-gain-control equipment concerning this invention, and especially drawing 1 (a) is the block diagram having shown the configuration when recording the calibration signal for AGC. A video-signal TCI conversion means for the data stream generating means for calibration signals for generating 0 and 1 which continued in order that 1 might generate the calibration wave for AGC, and 2 to carry out TCI conversion of the inputted video signal, and 3 are the data-division addition means for adding to the video signal which carried out TCI conversion of the output or data signal of the data stream generating means 1 for calibrations. Next, the actuation is explained. The 1-bit data of 1 or 0 are added to the video signal by which TCI conversion was carried cut with the video-signal TCI conversion means 2 with the data-division addition means 3 at the level blanking period of a video signal, level of the TCI signal which will be recorded if data are 1 is made high ("H" level), and level of the TCI signal which will be recorded if it becomes zero is made low ("L" level). Thus, except for a perpendicular blanking period, a data signal and a video signal are recorded for every Rhine. Drawing 2 is the wave form chart showing an example of a data signal, and on the basis of central TCI pedestal level, when higher [than it] and lower than "H" level and it, it is set to "L" level.

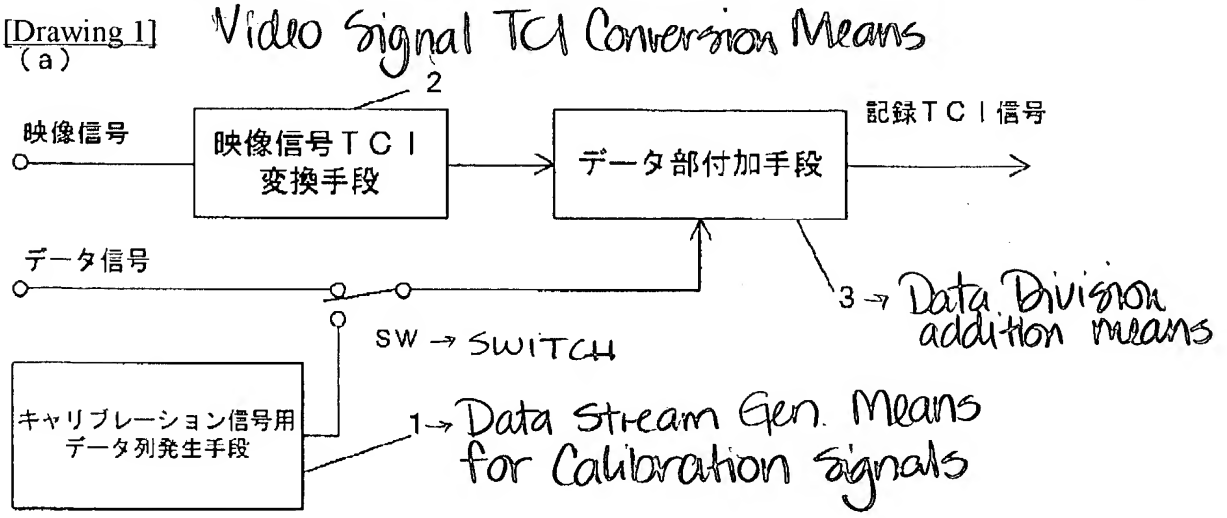
[0011] Although data, time codes, etc., such as an image format, are contained as a data signal, wave-like data with which 0 and 1 which are predetermined level follow a predetermined period as shown in drawing 3 are generated by switching a switch to the data stream generating means 1 side for calibrations. At this time, 0 and 1 of data are fixed level and it always does not change. Moreover, this data stream for calibrations serves as the same level as the data signal mentioned above, and when data are 1 and "H" level and data are 0, it serves as "L" level. It adds to the video signal which carried out TCI conversion with the data-division addition means 3 like the data signal which mentioned above this data stream for calibrations. A change-over with 0 and 1 of the data stream for calibration signals is

performed by a switch, the counter, etc. In addition, record to the level blanking period of the calibration signal for AGC is performed by covering two or more Rhine at this time.
[0012] At the time of playback, the data signal added to the playback TCI signal is compared with TCI pedestal level, and 0 is detected, when high and 1 is low (at the time of "L" level) (when it is "H" level). Drawing 1 (b) is the block diagram showing the configuration at the time of playback of an automatic-gain-control circuit. For "H" level detection average means and 5, as for a subtractor and 7, "L" level detection average means and 6 are [4 / an AGC criteria comparison means and 8] pulse generating means. Next, the actuation is explained. "Although inputted into H" level detection average means 4 and "L" level detection average means 5, when higher than the TCI pedestal level (specific level) used as criteria (at the time of "H" level)", when low (at the time of "L" level), it inputs into H" level detection average means 4 to "L" level detection average means 5, respectively, and the calibration signal for AGC added to a playback TCI signal is **. The inputted calibration signal for AGC the level change section (from level "to H" level ["L" level, "L"]" it changes to TCI pedestal level from H" level starting from TCI pedestal level and falling part) which waveform distortion produces The center section except several lines of the upper and lower sides of two or more Rhine where the avoided part and the calibration signal were recorded The average of (for example, detecting four lines of the center except two lines of the upper and lower sides, when the calibration signal is recorded on eight lines for the time of record) It calculates, respectively with "H" level detection average means 4 and "L" level detection average means 5. The output of L level detection average means 5 "from the output of H" level detection average means 4" is subtracted with a subtractor 6, and the AGC criteria comparison means 7 compares the value with the difference of "H" level and "L" level at the time of record. Consequently, if the difference at the time of playback is larger than the difference at the time of record, a pulse which makes gain of AGC small will be outputted from a pulse generator 8, and if the difference at the time of playback is smaller than the difference at the time of record, a pulse which enlarges gain of AGC will be outputted from a pulse generator 8.
[0013] Since several lines are covered, the calibration signal for AGC is recorded also by turbulence of a vertical synchronization which takes place at the time of the mode change of a search, a still, playback, etc. and the average of the level change section of the calibration signal for AGC and the part except up-and-down Rhine is used for detection by the above configurations at the time of playback, malfunction of AGC is not caused. Moreover, since the circuit of simple configurations, such as a switch which continues and outputs 1 bit data of 0 and 1 although the wave of the calibration signal for AGC is generated, and a counter, is used and the level is made equal to a data signal, the scale of the circuit for generating the calibration signal for AGC is small, and ends, and a cost cut can be aimed at.
[0014] When the data other than a configuration of having mentioned above are 0 and "H" level and data are 1, it is good also as "L" level (negative logic). Moreover, although it can gather 2 bits not only of two, "H" level and "L" level, but digital data at a time and can also record as four level, 0, 1, 2, and 3, it can consider as the calibration signal for AGC by putting this time predetermined level in order continuously.

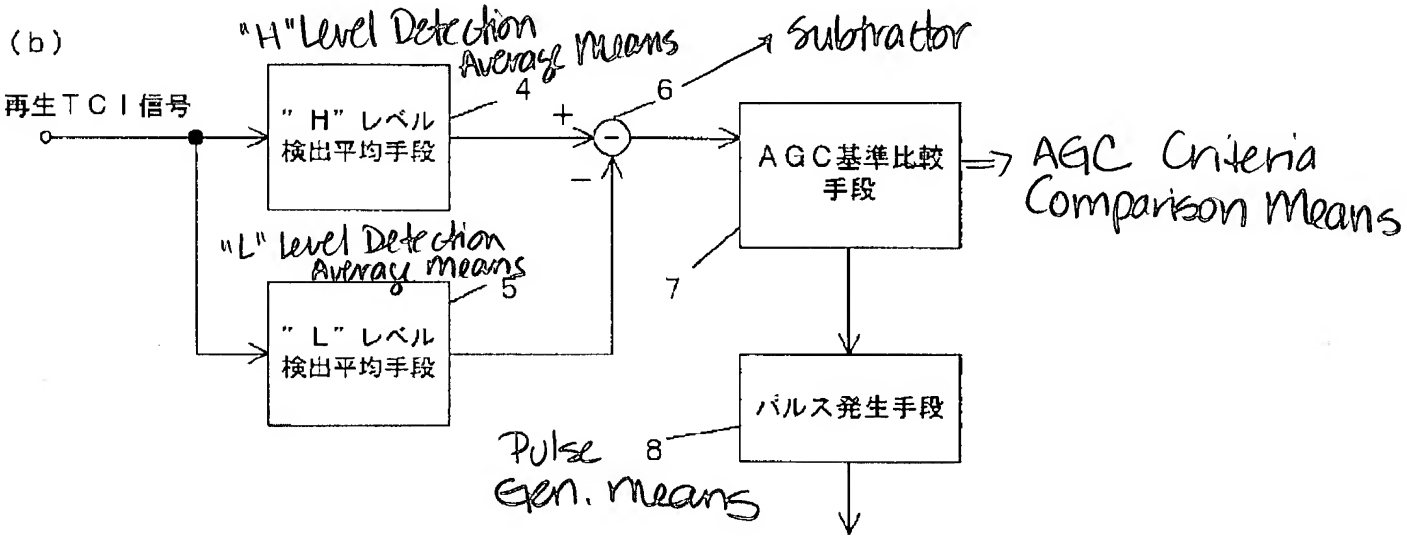
DRAWINGS

[Drawing 1]

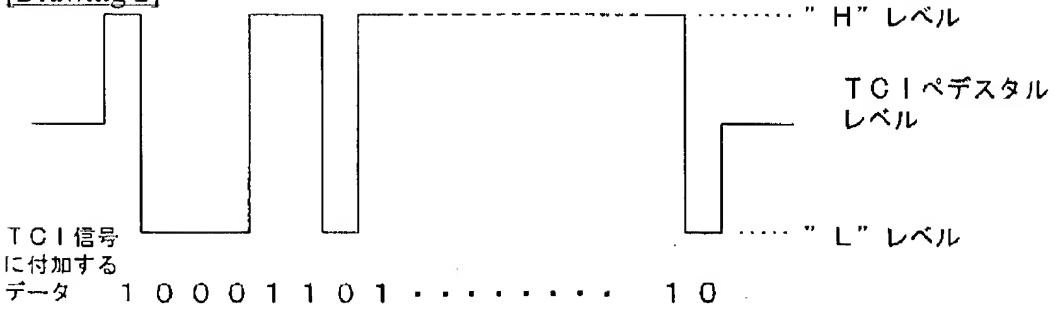
(a)



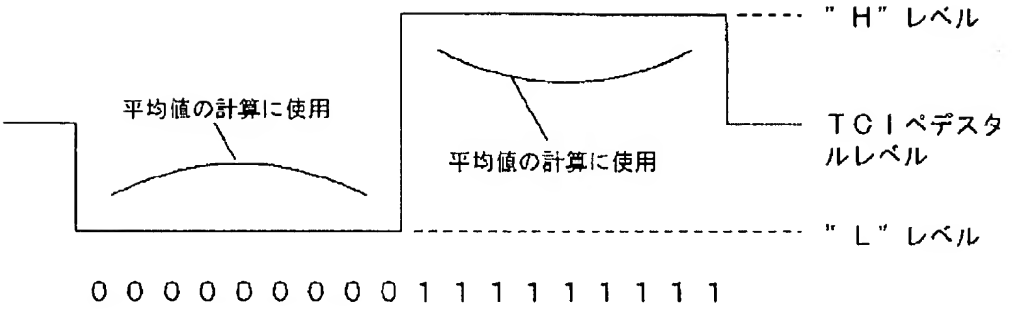
(b)



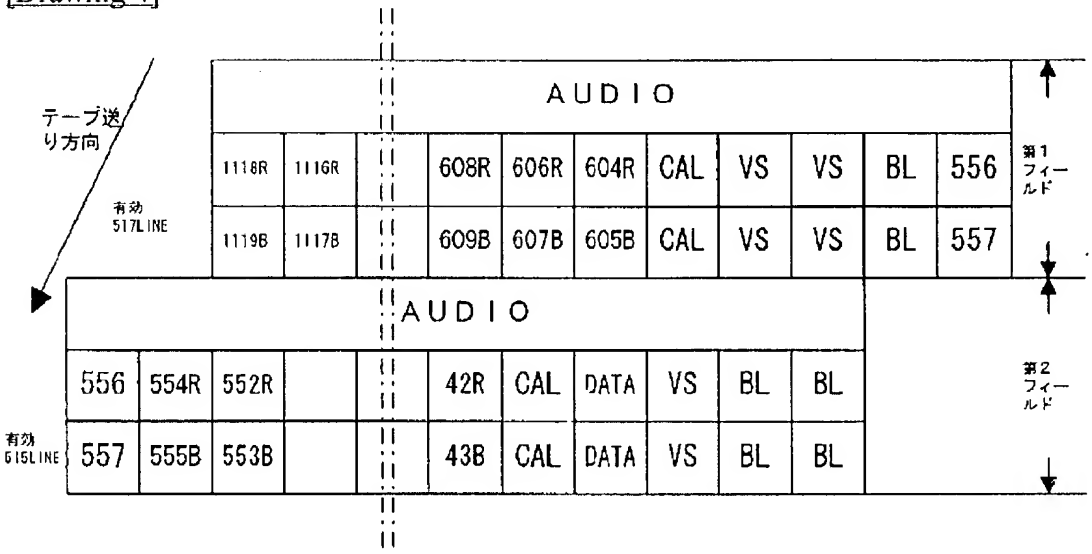
[Drawing 2]



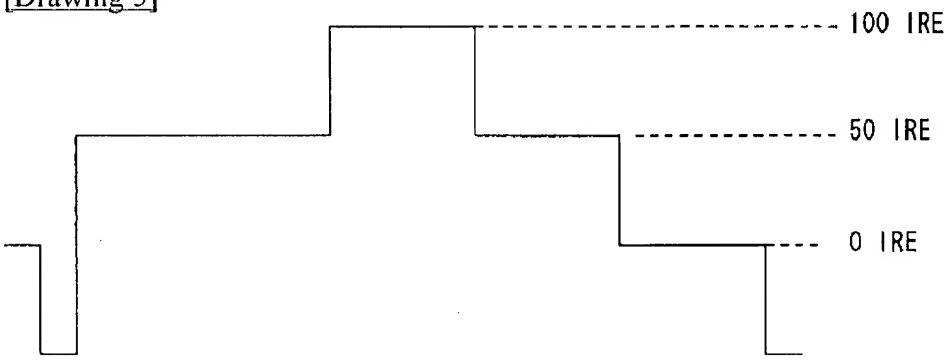
[Drawing 3]



[Drawing 4]

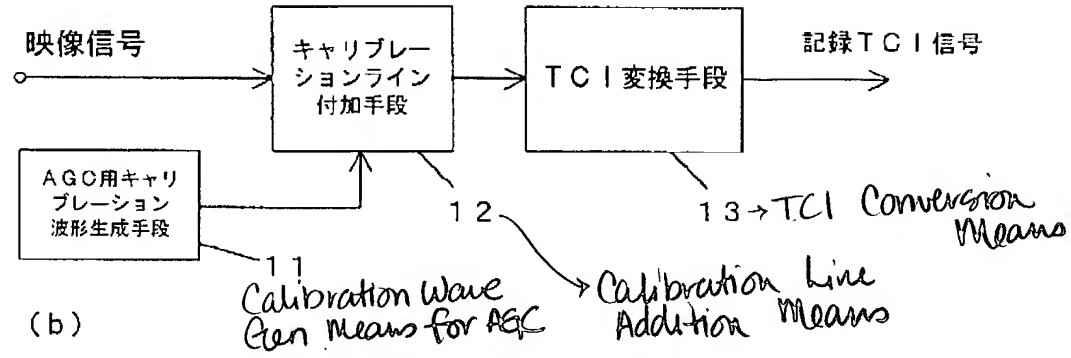


[Drawing 5]

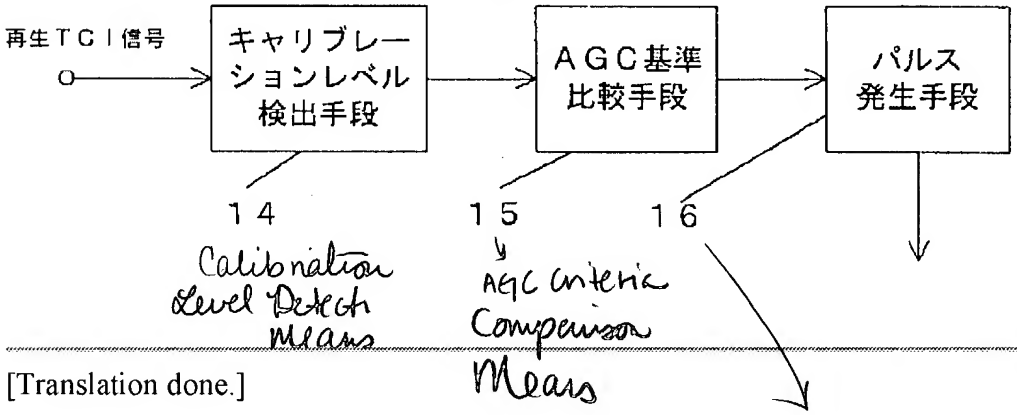


[Drawing 6]

（a）



（b）



[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing an example of the automatic-gain-control equipment concerning this invention.
[Drawing 2] It is the wave form chart showing an example of a data signal.
[Drawing 3] It is the wave form chart showing an example of the calibration signal for AGC concerning this invention.
[Drawing 4] It is drawing showing the tape pattern of a W-VHS method.
[Drawing 5] It is the wave form chart showing the conventional calibration signal for AGC.
[Drawing 6] It is the block diagram showing conventional automatic-gain-control equipment.
[Description of Notations]
1 Data Stream Generating Means for Calibration Signals
2 Video-Signal TCI Conversion Means
3 Data-Division Addition Means
4 "H" Level Detection Average Means
5 "L" Level Detection Average Means
6 Subtractor
7 AGC Criteria Comparison Means
8 Pulse Generating Means
11 Calibration Wave Generation Means for AGC
12 Calibration Line Addition Means
13 TCI Conversion Means
14 Calibration Level Detection Means
15 AGC Criteria Comparison Means
16 Pulse Generating Means

[Translation done.]